JPRS 76126

28 July 1980

USSR Report

LIFE SCIENCES

AGROTECHNOLOGY AND FOOD RESOURCES

No. 5

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

JPRS 76126

28 July 1980

USSR REPORT

LIFE SCIENCES

AGROTECHNOLOGY AND FOOD RESOURCES

No. 5

CONTENTS

AGROTECHNOLOGY

Fertilizer Plant Prepares for Production of Ammonia, Urea.......... 1

Trends in Agricultural Machine Technology Discussed.......... 2

Soy Farmers Introduce Industrial Procedures in Amurskaya Oblast.......... 6

Experience in Operating Controlled Climate Chambers.......... 8

What Scientists are Doing for the Non-Chernozem Zone.......... 9

ECOLOGY

High-Yielding Strong Winter Wheat Variety for Siberia and Northern Kazakhstan.......... 10

Use of Effluent Waters From a Swine Husbandry Complex.......... 11

FOOD RESOURCES

Estonian Geneticists Improve Agricultural Plants, Animals.... 12

HYDROBIOLOGY

Characteristics of Decomposition of Bacteria in the Body of Fish.. 15

Bactericidal Properties of Blood Serum of Fish............... 15

Toxic Effect of 2,4-D on Fish................................ 16

Enzymic Activity as an Indicator of the Physiological Condition of Fish... 17

Differential Diagnosis of Poisonings of Fish by Herbicides.. 17

INDUSTRIAL MICROBIOLOGY

Living Cells Utilized for Industrial Purposes................ 18

Microbiological Industry Contributed to Soil Fertility.. 20

Microbes to Play Important Role in Future Industry........... 25

New Uses for Products of Microbiological Industry............ 27

Requirements for Strains of Microorganisms Used in Production of Biological Preparations...................... 29

PLANT BIOCHEMISTRY

Problems and Developmental Prospects of Genetic-Selection Research Under Controlled Climate Conditions..... 30

Effect of Heterosis on Intervarietal Hybrids of Winter Rye... 31

Chemical Mutagenesis in the Selection of Peas for Quality.. 32

Valuable Specimens of Tetraploid Winter Rye.................. 32

Production of New Seed Varieties Should be Expedited......... 33

PLANT PATHOLOGY

Identification of Donors of Resistance to Yellow Rust of Wheat... 34

Resistance of Amphidiploid 206 to Diseases and Pests......... 35

VETERINARY MEDICINE

Resistance of Chicks to Pasteurellosis....................... 36

Resistance of Ixodidae Ticks to Acaricides................... 36

Toxicity of the Total Alkaloids of Harmel.................... 37

Sub-Acute T-2-Mycotoxicosis in Fowl.......................... 37

Chicken Influenza Caused by a Variant of the GP-4 Virus... 38

Serological Variants of Hemophilic Bacteria, Isolated From Swine... 39

AGROTECHNOLOGY

FERTILIZER PLANT PREPARES FOR PRODUCTION OF AMMONIA, UREA

Moscow PRAVDA in Russian 2 Jun 80 p 2

[Text]The Permnefteorgsintez Association is preparing to produce a complex for ammonia and urea. It will be able to produce 990,000 tons of fertilizers a year. A large amount of construction and installation work has been done. Of the complex's 34 basic production facilities, 30 have been released for startup and adjustment work.

In the photo: The general appearance of the construction of the complex.

[582-11772]
11772
CSO: 1840

TRENDS IN AGRICULTURAL MACHINE TECHNOLOGY DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 May 80 p 2

[Article by K. Belyak, minister of machine building for animal husbandry and feed production: "Modern Equipment for Sections"]

[Text] Imagine the multistory building of a dairy section for tens of thousands of head. Feed and water are automatically delivered to stalls and machines clean the barn and do the milking. There are very few people in this building. They are assigned the role of operators at automatic machine control panels. Imagination?, one will ask. Not at all. Scientists are already doing work aimed at the establishment of automatic sections fitted with fundamentally new equipment. This is a matter of not such a remote future, especially if we take into consideration the rates at which our very young machine building sector is developing. Suffice it to say that during the current five-year plan period rural areas obtained approximately the same amount of machinery and equipment as during the preceding two five-year plans taken together.

We know the vast importance attached by the party and the government to the technical retooling of such key sectors of agriculture as animal husbandry and feed production. The decisions of the July (1978) and November (1979) Plenum of the CPSU Central Committee outlined a wide program for the further development of the country's entire agrarian and industrial complex.

The ministry, pursuing a unified technical policy in the development and production of machinery for animal husbandry and feed production, concentrates forces and funds on the main trends in scientific and technical progress. A turn toward a fundamental renovation of equipment, especially in feed production, has been made during the years of the 10th Five-Year Plan. Agricultural workers have already given quite a good evaluation to the serially manufactured, new fodder harvesting machines. They include the KSK-100 self-propelled combine, to the development of which the personnell of the design office of the Gomsel'mash Plant headed by general designer G. Trofimuk made an important contribution, and the KPS-5G self-propelled mower-crusher developed at the Lyubertsy Agricultural Machinery

Plant imeni Ukhtomskiy. The introduction of these units increases labor productivity 1.5- to 2-fold and makes it possible to reduce the pool of fodder harvesting equipment and disengage a large number of machine operators. By means of them harvesting is done at the best agrotechnical time and the quality of feed improves considerably. Among the equipment for feed production the PS-1.6 pick-up baler, the mass production of which the personnel of the Agricultural Machinery Plant imeni M. V. Frunze mastered, should also be mentioned. Its productivity is 1.5 times as high as that of the previous model. It operates in combination with machines for the pickup and transportation of bales, as well as for grinding them before feeding.

Developing new equipment, we made it a rule to devise not individual machines but, rather, sets of machinery and equipment ensuring the mechanization of all interconnected operations of the industrial process. The sector now turns out 90 such sets out of the 108 envisaged for 1976-1980. They include sets for dairy sections for 200 to 1,200 head. Among the innovations developed for large-horned cattle sections and complexes one would like to note the RK-50 conveyer-type fodder distributor, the RSP-10 trailer-type distributor-mixer and the automated milking installations of the Yelochka and Tandem types. The new equipment raises labor productivity 1.5- to 2-fold. The milking installations are especially effective. They are serviced by one person. He has only one manual operation to perform--to put teat cups on udders. The machine does all the rest. True, this requires operators to have good training. The enumerated units were developed in the design office for machines for large-horned cattle (Riga) under the management of general designer B. Galvan.

Sets for the fattening of 12,000 to 108,000 head of hogs annually are also produced. Such equipment is designed for large specialized industrial-type farms, where animals are kept on latticed fields. Preparations are being made for the introduction of multitier cage equipment for fattening hogs. This will make it possible to increase the density of placement as compared with ground-type keeping and will lower labor expenditures to one-tenth.

Poultry factories and sections receive new sets of automated cascade-type cage equipment. The lowest level of overall mechanization still remains in sheep breeding. However, the appropriate measures are also being taken there. The large sheep breeding complexes under construction will be equipped with sets of new machines, which will make it possible to lower the labor expenditures on keeping one ewe to one-half and on mutton production, to one-sixth.

Thus, the development of sets of machinery and equipment for large industrial-type animal husbandry complexes acquires dominating importance in the sector's technical policy. It should be noted that we pay much attention to the organization of the delivery of equipment in full sets directly from plants to facilities and to the "shef-montazh" [i.e., to the facility which provides expertise in the assembly and setting-up of the equipment] under the guidance of our specialists. This ensures a rapid start-up of equipment and its reliable and competent operation.

Finally, we cannot forget the equipment for auxiliary farms. As is well known, the party and the government consider such farms--both private and at enterprises--an important help in providing the population with food products. Our plants now manufacture 34 types of articles designed for auxiliary farms. They include equipment for keeping domestic animals and poultry, sets of orchard and garden tools and so forth.

On the whole, to what extent does our sector meet the needs of agriculture? How does it affect the level of mechanization in animal husbandry? I shall cite several figures. During the decade the level of overall mechanization at large-horned cattle sections increased from 9 to 40 percent and in hog and poultry breeding, to 62 and 70 percent respectively. At the same time, it must be stated that as yet we do not fully meet the general need for equipment, especially for the new sort. For example, this is the case with highly productive fodder harvesting machines. According to the estimates of specialists, for the development of the necessary pool of KSK-100 combines 20,000 units must be manufactured annually. Unfortunately, the sector does not have the production capacities for this, just as there is a shortage of them for the output of some other modern equipment of a high technical level. The decrees of the CPSU Central Committee and the USSR Council of Ministers envisaged measures for the development of our plants. About 500 million rubles have been allocated for the construction of new and reconstruction and technical retooling of existing enterprises in the last 4 years. In particular, the Gomsel'mash Plant is now being reconstructed and expanded, which will make it possible to increase the production of the KSK-100 self-propelled combines to the necessary volumes. Even greater capital investments were envisaged for the future five-year plan. Thus, we will have the opportunity to increase the output of equipment for which rural areas are waiting.

This means that output per rural worker will increase constantly, and with a steady rise in the production of livestock products, less manpower will be needed. As is well known, the task of lowering the shortage of manpower is now one of the major tasks in the country. It is especially acute in rural areas. Equipment received at kolkhoz and sovkhoz sections makes it possible not only to reduce the need for workers, but to make labor more attractive, easier and prestigious, if you wish. In fact, is it possible to compare the previous labor of a milkmaid with the work of a mechanical milking operator? It should be stressed that your people react to the changes in the nature of labor with special sensitivity. Where overall mechanized sections are established, the problems of enlisting young people in work are solved much more easily. It should be stated that more than one-third of the large-horned cattle stock and more than one-half of the hog and poultry stock are now kept in such sections.

An increase in the volumes of production of agricultural machines is one aspect of the matter. A rise in their technical and economic level and improvement in the quality of manufacture, another.

In order to raise the technical level of machines at enterprises, an overall system of output quality control has been introduced at the sector and much attention is given to standardization, as well as to the certification of articles according to quality categories. The proportion of machines manufactured with the State Badge of Quality now exceeds 30 percent of the total production volume. We will continue to improve our equipment and to increase its reliability and durability.

Recently, SOTSIALISTICHESKAYA INDUSTRIYA discussed the work done in our sector on the introduction of a new indicator--normative net output. This is a new matter and a great deal must still be done to obtain a yield. However, it is important that we have received a reliable tool by means of which we will refine the mechanism of management, improve qualitative and quantitative indicators every year and increase the production of modern highly productive equipment for rural areas.
[577-11439]

11,439
CSO: 1840

SOY FARMERS INTRODUCE INDUSTRIAL PROCEDURES IN AMURSKAYA OBLAST

Moscow SEL'SKAYA ZHIZN' in Russian 1 Jun 80 p 1

[Article by Yu. Baklanov: "Using Industrial Procedures"]

[Text] The farmers of Amurskaya Oblast have reserved the best fields for their soy crop, and they have stocked effective plant protection resources. Many of them are being introduced into the soil prior to planting. Industrial procedures presently being introduced for the first time on 103,000 hectares call for using optimum fertilizer doses, full mechanization, and flowline performance of all operations. These procedures have already been tested on the fields of an experimental production farm of the All-RSFSR Scientific Research Institute of Soy. As a result the average yield enjoyed by this farm over a 4-year period was 15.6 centners of grain per hectare.

An extensive production experiment is presently underway on the fields of Tambovskiy, Ivanovskiy, and Konstantinovskiy rayons. Herbicides have been supplied to their farms. Seven centners of mineral fertilizers have been allocated to each hectare. More than 750 soy farmers have studied the new industrial procedures in special courses. Operational groups consisting of workers from the oblast agricultural administration, the soy institute, and the Amursel'khozkhimiya Association have been created to control the quality of field operations.

High excellence of farming has become the law for the work of soy farmers of Vostok Kolkhoz, Tambovskiy Rayon. They are trying to get 15 centners of grain from every 3,800 hectares. Almost 90 percent of the soy is being planted on fields left fallow in winter. Moisture was locked into these fields promptly, and weed growth was encouraged. Following application of the herbicide treflan, the fields were once again packed. But due to the cold weather the planting was delayed to some extent. With the onset of stable warmth the integrated farming teams went right to work. The capabilities are such that we can do all of the planting in five or six work days.

A total of one hard week of work was devoted to soy planting by farmers of Partizan Sovkhoz and Priamur'ye Kolkhoz, which possess the largest area devoted to this crop--more than 7,000 hectares. The entire complex of industrial operations was completed at the farms with high quality.

Soy farmers are turning special attention to the cleanliness of the fields. Weedy plots are being subjected to continuous cultivation. Many farms have mounted arrow-shaped blades with a wide cutting span in the two front rows of their cultivators, and ripping teeth in the third and fourth rows. In a single pass, such a machine unit destroys 13-18 percent more weeds than when it is used with the standard set of working implements.

Successful introduction of these industrial procedures will increase the power of the Amur hectare and create the conditions for greater soy yield everywhere. The planting of this crop on half a million hectares is continuing at an accelerated pace.
[583-11004]

11004
CSO: 1840

UDC 631.344.4:628.8

EXPERIENCE IN OPERATING CONTROLLED CLIMATE CHAMBERS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 19-21

YEREMENKO, V. A., BOGACHEV, G. I., SAVCHUK, S. K. and MONICH, V. N.,
Belorussian Scientific Research Institute of Farming

[Abstract] The Belorussian Scientific Research Institute of Farming operates varied controlled climate facilities. In particular, the operation of KV-1 type controlled climate chambers (CCC) since 1978 for the purpose of selection, physiological and genetic research into spring (barley, wheat, triticale, lupine) and winter (rye, triticale) crops has revealed certain shortcomings in their design execution. Fans and fan bearings have tended to break down fairly rapidly and insulation has at times proved defective. An automatic method for thawing the evaporators of KV-1 has been devised and is being used. Emergency standby and signaling devices have been installed. In view of the time-consuming nature of the repair of broken-down CCC, two reserve CCC, the KV-1R and the KV-1L, have been installed. Photothermal and trophic modes of growing crops in CCC have been optimized. Proper maintenance of the CCC requires good organization: the Institute's CCC are serviced by a crew of 3: an electrical engineer, an electrician, and a refrigeration mechanic. On the whole, the experience gained in operating CCC has served to increase their reliability, thus facilitating the conditions of research and demonstrating the great potential of Soviet-built CCC of the KV-1 type. [581-1386]

UDC 633/635:631.527(470.31)

WHAT SCIENTISTS ARE DOING FOR THE NON-CHERNOZEM ZONE

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 7-10

VASILENKO, I. I., candidate of agricultural sciences, VASKhNIL [All-Union Academy of Agricultural Sciences imeni Lenin]

[Abstract] Genetic and agricultural institutes are working to develop the agriculture of the Non-Chernozem Zone of the RSFSR. Thus, e.g., the Zone's rye selectioners received the Imerig 1, a newly developed donor of short stalks and of immunity powdery mildew. Measures to assure year-round provision of vegetables to the Zone's population have been developed, along with various high-yielding varieties of winter wheat, spring wheat, winter rye, and spring barley. Much work has also been done to regionalize these varieties. Research and development work on the growing of fodder crops and applications of fertilizers is continuing. New varieties of annual and perennial grasses have been developed and varietal seed work has been improved as regards the potato and vegetable crops. Even so, however, the work of selection centers and other scientific research institutions to develop agriculture in the Non-Chernozem Zone leaves something to be desired. Little has been done to prevent the growing of lodging-prone varieties of winter rye, spring barley, and oats. High-yielding high-protein varieties of beans and other pulse crops still have not been made available, and the currently grown varieties of flax, potatoes, and vegetables display certain shortcomings. Many problems of industrial seed production remain unsolved.
[581-1386]

ECOLOGY

UDC 633.11:631.526.32(571.51.571.13+
+574.22.574.23)

HIGH-YIELDING STRONG WINTER WHEAT VARIETY FOR SIBERIA AND NORTHERN KAZAKHSTAN

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 p 33

SUSLYAKOV, V. S. and ZYKIN, V. A. candidates of agricultural sciences
and VYSOKOS, G. P., candidate of biological sciences

[Abstract] A new high-yielding strong winter wheat variety, Omskaya 9, has been developed at the Siberian Scientific Research Institute of Agriculture. It is adapted to rigorous climatic conditions, it has a high grain yield and is resistant to drought, stalk rust, and lodging. It was developed through the group selection and combination of 6 homogeneous lines isolated from Hybrid Combination No 1210 (Bezostaya 1 x Satatovskaya 29) x Saratovskaya 29. The first crossing had been performed in 1963. The Omskaya 9 belongs in the forest-steppe West Siberian ecological group. Its per hectare grain yield is 6.1-7.2 centners higher than that of the Saratovskaya 29 variety. Its highest yield so far, 64.9 centners per hectare, has been achieved in Krasnoyarskiy Kray. The Omskaya 9 is now being studied and planted on 30 base farms in Siberia and Northern Kazakhstan, where its average yields ranged at 35-40 centners per hectare. In 1979 it was planted on an area of 112,000 hectares in Omskaya Oblast alone, and a much broader planting of this variety is now recommended, since its yields surpass those of the Saratovskaya 29, the Novosibirskaya 67, and other wheat varieties in both wet and dry years. Being a late-ripening variety, the Omskaya 9 should be sown early--before 20 May in the Siberian steppe and forest-steppe conditions. Owing to a moderate formation of tillers, it is recommended that the sowing quota be increased by 10-15%.
[581-1386]

UDC 619:614.9:628.33/.36

USE OF EFFLUENT WATERS FROM A SWINE HUSBANDRY COMPLEX

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 24-25

SMIRNOV, P. P., Sovkhoz imeni 50th Anniversary of the USSR

[Abstract] A discussion of the use of waste waters from a swinery complex includes a description and discussion of the placing in operation of installations for use of waste waters for irrigation. Some problems and precautions related to this are cited. Three basic methods of processing and using waste waters are discussed. The importance of developing measures for dealing with these problems is underlined by the fact that by 1980 there will be 500 million tons of manure annually in the USSR.
[579-2791]

FOOD RESOURCES

ESTONIAN GENETICISTS IMPROVE AGRICULTURAL PLANTS, ANIMALS

Moscow SEL'SKAYA ZHIZN' in Russian 1 Jun 80 p 2

[Article by O. Priylinn, Director, Estonian SSR Academy of Sciences Institute of Experimental Biology: "Controlling Heredity"]

[Text] Our institute's geneticists have once again confirmed the effectiveness of using chemical mutagenesis to obtain a raw material opening new possibilities for the selection of wheat, barley, and other crops.

In order to raise the resistance of wheat to fungal diseases that do significant harm to the yield, scientists are combining chemical mutagenesis with hybridization. The chromosomes of wheat varieties susceptible to diseases are being replaced by those of wild grasses related to wheat and distinguished by enviable immunity. In particular, by transferring genes responsible for hereditary resistance from wild species into the chromosomes of cultivated varieties, our geneticists have obtained plants resistant to diseases. These plants are of great interest to selection. As an example let me cite the experience of improving an important characteristic of "Tammi" barley--ear brittleness. The work was done at the Yygeva Selection Station under the guidance of its director, Kh. Kyuyts, and our institute's genetics sector director, T. Orav. Following treatment of "Tammi" variety seeds with nitrosoethylurea and nitrosomethylurea, more than 500 lines of plants distinguished by a strong stalk beneath the ear were isolated. Of these, the most promising were selected. In several years of tests they demonstrated high resistance to lodging, and their yield noticeably exceeded that of the initial variety.

In recent years plant breeders of the Yygeva station obtained short-stemmed forms of winter rye, but they were not winter-hardy. To eliminate this serious shortcoming the rye seeds were treated with chemical mutagenic compounds. There are all the grounds for suggesting that plants exhibiting greater winter hardiness will be breeded by this means.

Development of biological ways to raise the yield of potatoes is very important to many zones of the country; protection of potatoes against diseases also demands constant attention. It was established through the efforts of the Institute of Experimental Biology in cooperation with the republic's Scientific Research Institute of Agriculture and Land Reclamation that seedlings obtained from crossed hybrids were significantly infected by various forms of viruses causing mosaic diseases. Special experiments conducted under the guidance of our institute's virology sector chief B. Nurmiste, showed that viruses are transmitted to seedlings from parental forms through seeds, and that external transmission pathways have secondary significance. Detailed analysis revealed that an inactive, latent form of the virus is transmitted with seeds. During the vegetative period, this latent, so-called provirus gradually becomes active and begins to produce active forms.

The most dependable method for evaluating parental forms for stability against viruses is to evaluate their progeny, obtained as a result of self-fertilization and grown in conditions precluding the possibility of chance viral infection from the outside. Virological studies substantiated the need for making changes in the potato selection system approved by the republic's breeders. The principal modification to be introduced into the system is acquisition of initial parental forms free of inherited viral infection.

Plants infected by viruses are being removed from seed potato plots in the republic. But the symptoms of such diseases are not always clearly expressed. This is why a serological method was developed to establish viral infection, making use of specially prepared antiserums. The sensitivity of the serological reaction is high. To analyze a plant, a drop of antiserum and a even smaller amount of juice from the tuber would be enough. Labor productivity has now risen dramatically. A single analyst can now perform several thousand analyses in a day.

A technique has been developed in the institute for obtaining pure viral preparations, and laboratory preparation of diagnostic serums for the principal mosaic viruses infecting the republic's potato fields has been organized. True, for the moment there is only enough diagnostic serum for a million analyses--a fourth of the amount required. But the institute has made plans to expand production of such serums, so as to provide for all of the needs of seed potato growing.

Scientists are devoting a great deal of attention to revealing and utilizing biological reserves in animal husbandry. Working together with scientists of the Estonian SSR Scientific Research Institute of Animal Husbandry and Veterinary Medicine, our institute's geneticists and physiologists are studying genetic and physiological ways for raising the productivity of animals, and they are revealing the laws governing inheritance of traits responsible for their productivity. The republic is now making use of the latest methods of population genetics in selection. One of the progressive procedures is the method of selection indices, which permit us to determine the breeding value of animals on the basis of several characteristics. Such indices are gradually being introduced into the practice of dairy cattle ranching.

Cattle fertility has been decreasing at the republic's farms in recent years, which is causing natural concern. We feel that one of the reasons for the low fecundity of cows may be abnormalities in sex cell chromosomes--chromosome mutations. After all, the viability of the fetus is reduced when chromosome abnormalities are present. In most cases such embryos die in the first half of pregnancy. Colleagues of the animal genetics sector made it their objective to test all producer bulls used at the artificial animal insemination stations. Removal of defective chromosome carriers from the breeding stock will make it possible to raise the productivity of cows.

Our geneticists, physiologists, and biochemists are also dealing with the problems of utilizing the genetic potential of animals to the maximum. We can note for example the research being conducted at the Ranna Poultry Sovkhoz to improve broiler feeding. Investigation of the intensity of protein synthesis and formation of meat in the first weeks of chick life showed that combined feeds with a high concentration of protein and vitamins are used most effectively during this period. Experiments conducted here by Candidate of Agricultural Sciences V. Lind revealed significant reserves within the sector. Were chicks to be given feed with a higher protein concentration--24 percent--in their period of intensive growth (the first 30 days of life), and were its concentration to be reduced to 17 percent in the final fattening period, this would insure more-intensive growth of broilers, and a significant savings of scarce feed protein. We believe that the experience of the Ranna Sovkhoz deserves the most serious attention of poultry raisers.
[583-11004]

11004
CSO: 1840

HYDROBIOLOGY

UDC 619.576.809.7:639.309

CHARACTERISTICS OF DECOMPOSITION OF BACTERIA IN THE BODY OF FISH

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 30-32

BALABANOVA, L. V., USSR Academy of Sciences Institute of the Biology of Inland Waters

[Abstract] A study of decomposition and excretion of products of decomposition of ^{14}C labelled Hydrogenomonas facilis and Aeromonas punctata after intraperitoneal injection into carp and crucian carp indicated that the intensity of decomposition of the bacteria and the excretion of products of their decomposition depend upon species peculiarities of the bacteria and upon the state of the reticuloendothelial system and the metabolic activity of the fish body. This confirms the importance of factors which increase the metabolic activity of the fish organs and which stimulate the reticuloendothelial system cells in the defense reactions of fish.
[579-2791]

UDC 619.576.809.7:639.309

BACTERICIDAL PROPERTIES OF BLOOD SERUM OF FISH

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 32-33

MIKRYAKOV, V. R. and SILKINA, N. I., USSR Academy of Sciences Institute of the Biology of Inland Waters

[Abstract] Studies of the bactericidal activity of blood serum of the bronze bream (104 fish) in different periods of the year in relation to the change of lipids and the protein-lipid ratio, with Aeromonas punctata

as the test microbe, showed a dependence of the bactericidal activity on the total lipids, which differed at different periods of the year. Low levels of bactericidal activity and lipid level were low in the spawning period in June but increased by the end of the spawning period. A direct correlation was established between bactericidal activity and the protein-lipid ratio. These data indicated the vital role of lipids in formation of immunity mechanisms and in the resistance of the fish.
[579-2791]

TOXIC EFFECT OF 2,4-D ON FISH

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 59-60

NAZARENKO, A. I. and MAKHNO, P. M., All-Union Scientific Research Institute of Humid Subtropics, All-Union Institute of Experimental Veterinary Medicine

[Abstract] A study of the effect of a 45-day exposure of carp (20-25 g mass) to chemically pure 2,4 dichlorophenoxyacetic acid in a concentration of 40, 60, 90, 100, 120 or 150 mg/l in a 60 liter aquarium (18 fish in each) revealed no clinical signs of intoxication from concentrations of 40 or 60 mg/l. Higher concentrations produced typical signs of intoxication on the 20-27th day. These symptoms lasted 2-7 days and on 23-30 days deaths occurred among the 18 fish in each aquarium as follows: (90 mg/l - 10; 100 mg/l - 14, 120 mg/l - 9 and 150 mg/l - 18. Symptoms gradually disappeared in surviving fish. Metabolites from decomposition of 2,4-D in the water were as toxic as the original forms. Changes caused by concentration of 10 mg/l were reversible but those occurring at concentrations of 90-150 mg/l were not. The greatest changes occurred in brain, kidneys, liver and heart.
[579-2791]

UDC 619:612.015.1:639.215.2

ENZYMIC ACTIVITY AS AN INDICATOR OF THE PHYSIOLOGICAL CONDITION OF FISH

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 60-61

STROKUN, N. A., Azov Scientific Research Institute of the Fishing Industry

[Abstract] In a study of the prospects of the use of the enzymic activity of some fish organs as a biochemical indicator after intoxication by organophosphorus pesticides, carp in their first year of life were exposed to dimethyldichlorovinylphosphate (DDVF) in concentrations of 10, 1, 0.1, 0.01 or 0.001 mg/l in 75 l aquariums. Enzymic activity of acetylcholinesterase (AKhE) of the brain, ATP-ase of the gills and catalase of the liver were then studied. A 10 mg/l concentration of DDVF inactivated AKhE in the brain by 93.6 percent and 1 mg/l--by more than 50 percent. Doses of 0.1, 0.01, 0.001 mg/l caused inhibition by 4.1; 12.3 and 8.2 percent respectively. DDVF in a dose of 10 mg/l or 1 mg/l increased ATP-ase activity by 34.7 percent, 0.1 mg/l--by 9.3 percent and 0.01 mg/l or 0.001 mg/l--by 5.5 percent. A 10 mg/l dose of the pesticide reduced catalase activity of the liver by 7.7 percent. Doses of 0.1 mg/l, 0.01 mg/l and 0.001 mg/l increased it by 7.7, 7.7 and 2.5 percent respectively.
[579-2791]

UDC 619:615.9.632.95:616.07:639

DIFFERENTIAL DIAGNOSIS OF POISONINGS OF FISH BY HERBICIDES

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 62-63

METELEV, V. V., All-Union Institute of Experimental Veterinary Medicine

[Abstract] Differential diagnosis of toxicosis of fish caused by propanid, yalan and bentokarb (derivatives of thiocarbamic acid) is very complex because clinical and pathalogical-anatomical symptoms are almost the same for all three. The use of hematological biochemical chromatographic and chemico-toxicological studies in such diagnosis are discussed. The cumulation characteristics (bentokarb and yalan--moderate, and propanid--pronounced) and the place of localization (bentokarb--liver, spleen; propanid--liver, spleen, brain, kidneys; yalan--gills and skin) provide some helpful data. Measures for preventing fish poisonings from these herbicides are discussed briefly.
[579-2791]

INDUSTRIAL MICROBIOLOGY

LIVING CELLS UTILIZED FOR INDUSTRIAL PURPOSES

Moscow PRAVDA in Russian 2 Jun 80 p 7

[Article: "The Living Cell Industry"]

[Text] The achievements of science in recent years have opened up new horizons for the comprehensive utilization of micro-organisms in man's economic activity. It has turned out that yeasts and bacteria, microscopic fungi and algae are capable under plant conditions of producing from vegetable raw material, wastes of the pulp and paper, alcohol and dairy industry, agricultural production and from petroleum paraffins, the most valuable products: proteins, vitamins, amino acids, enzymes and antibiotics. Other varieties of micro-organisms work well to extract impurities from waste waters. Still others have proved themselves to be reliable protectors of plants from diseases and pests. Even others are skillful "miners" and "metallurgists": from poor ores they extract copper and molybdenum, germanium and silicon , and even poisonous arsenic and gold which is not subject to chemical effects.

The economic significance of microbiological products can be illustrated if only from the example of yeasts. Adding one ton of yeasts to the ration of poultry makes it possible to obtain an additional 1.5-2 tons of meat or 25,000-35,000 eggs. To add this same ton in hog raising replaces 3.5-5 tons of forage grain.

In 1966 our country created a specialized branch: the microbiological industry. It was called upon to provide the national economy, and above all agricultural production, with valuable products of microbiological synthesis.

Responsible tasks were set for the branch by the 25th party congress and the July (1978) plenum of the CPSU Central Committee. The assignments for the Tenth and Eleventh Five-Year Plans envision development of the microbiological industry and considerable increase in the production of nutritive yeasts, lysine and other products of biosynthesis.

The tasks for accelerated development of the branch are being consistently fulfilled. The country has created scientific research and planning institutes of genetics and selection, industrial micro-organisms, biosynthesis of protein substances, biological preparations, biotechnical studies and others, which have already gained authority. They are following a course towards the construction of gigantic enterprises with capacities of from 50,000 to 300,000 tons of products a year. During the 15 years since the time the branch was organized the average annual rates of growth of industrial production have been more than 11 percent. Under the current five-year plan, taking into account the plan for 1980, the average annual growth will exceed 9 percent.

The production structure has changed essentially. While in the year the branch was organized the proportion of products for agriculture amounted to only 12 percent, this year it is reaching almost three-fourths. The July (1978) and November (1979) plenums of the CPSU Central Committee made the microbiological industry responsible for the manufacture and delivery to agriculture of many products of microbiological synthesis as well as effective preparations for processing agricultural raw material.
[582-11772]

11772
CSO: 1840

MICROBIOLOGICAL INDUSTRY CONTRIBUTED TO SOIL FERTILITY

Moscow PRAVDA in Russian 2 Jun 80 p 7

[Article by R. Rychkov, chief of the Main Administration of the Microbiological Industry under the USSR Council of Ministers: "What Microbiology Can Do"]

[Text] The very foundation of agriculture--fertile soil--is given to us by micro-organisms. In the upper layer of good arable land on each hectare there live so many invisible workers that their overall weight amounts to several tons.

With the creation of the microbiological branch in our country it became possible to raise the most active varieties of micro-organisms under plant conditions so that by applying them to the soil one can increase the force of the invisible army in charge of fertility. We are speaking in particular about the production of bacterial fertilizers which provide for fixing atmospheric nitrogen and improve the plants' assimilation of mineral salts. We have also arranged the production of microbes which are safe for man and useful to animals but are capable of reliably protecting agricultural crops from pests and diseases.

The products of the microbiological industry that are intended for animal husbandry are even more diverse and valuable. They include supplements to the rations: protein and vitamin preparations, antibiotics, lysine and premixes. In the near future they will include whole milk substitutes that are based on non-dairy products, hydrolized sugar, which makes up for the shortage of easily digestible carbohydrates in the feeds for the dairy herd, prostaglandin, tylosin and other products for preventive zooveterinary medicine.

In order to efficiently take advantage of the possibilities of microbiological synthesis, from year to year the branch's scientific, design and production base is being expanded. They have constructed large specialized enterprises that are equipped with modern domestic equipment. This has made it possible during the years of the branch's existence, with a 2.5-fold increase in the number of personnel, to increase the volume of output more than 5-fold, including almost 30-fold for agriculture.

In addition to further development of plants that raise nutritive yeasts from hydrolysates of wood and agricultural wastes, a large industry has been created for producing yeasts from purified liquid paraffins. This has made it possible, in particular, to reduce proportional capital expenditures significantly--by almost one-third, to improve working conditions and, especially important, to provide for bringing into economic circulation new sources of protein that are practically independent of the caprices of the weather.

This is of great state significance. Comrade L. I. Brezhnev, when describing at the November (1979) Plenum of the CPSU Central Committee the tasks related to supplying the population with foodstuffs, especially meat, drew attention to the need to solve more rapidly the problem of protein for balanced feeds.

The fact is that the main grain crops do not have enough of the essential amino acids--lysine, methionine, tryptophan and others. When there is a shortage of even one of these the animal body can not fully assimilate the protein substances. As a result, per unit of output the farms expend 1.5-2 times as much grain as is required according to the norm. The country fails to receive a good deal of meat, eggs and milk.

In order to transform grain into a full-value feed, one adds to it such protein components as fish and meat-bone meal, non-fat milk and soy curds. But domestic resources do not include enough supplements of this kind. Therefore microbiological synthesis of protein is becoming more and more important: yeasts and other kinds of dry microbiomasses fully replace traditional protein supplements. The experience of sovkhozes, kolkhozes, animal husbandry complexes and poultry farms has proved the great effectiveness of enriching feeds with yeasts, and also lysine and premixes.

In 1980 the country's industry will produce a total of more than a million tons of dry nutritive yeasts that contain more than 50 percent protein, which will make it possible to balance 20 million tons of mixed feeds. But the demand for microbiological protein is much greater than the present possibilities of its production and this demand continues to grow. In the future it will be necessary to increase the average annual output of microbial protein to 11-12 million tons to as to fully solve the problem of protein enrichment of forage grain.

Workers of the branch are faced with the task of obtaining as much output as possible with existing capacities by continuously improving the quality and the commercial forms and more rapidly introducing and assimilating enterprises that are being constructed. The majority of collectives are keeping up with the assignments for the output of products for animal husbandry.

In the first months of 1980 workers of the branch significantly increased the production of products as compared to the same period of last year.

They produced more than 2,000 tons of protein and vitamin concentrates from purified paraffin in excess of the plan and they are overfulfilling the plan for the production of lysine, nutritive antibiotics, nutritive sugar and a number of other kinds of products.

Competing in honor of the 110th anniversary of the day of the birth of V. I. Lenin, the collectives of five enterprises, more than 100 shops, sections and brigades, and more than 3,000 workers of the branch completed the five-year assignment ahead of schedule. Collectives of the enterprises and organizations have extensively developed socialist competition for early fulfillment of the plans for 1980 and a worthy greeting with labor gifts for the forthcoming 26th CPSU Congress.

A good deal is being done. But, by analyzing the results of the branch's work in light of the decisions of the plenums of the CPSU Central Committee, we can see a number of omissions and problems. In 1979 the consumers failed to receive 200,000 tons of yeasts, 660 tons of lysine and 2,000 tons of premixes. Technical rearmament of the enterprises is proceeding slowly, especially in the hydrolysis production, and there are mistakes in planning. There are justifiable complaints about the quality of the product. The branch is faced with complex scientific problems. Researchers of institutions of the USSR Academy of Sciences, ministries and departments, are participating in solving them along with institutes of Glavmikrobioprom.

The progress of the microbiological industry is impeded also by a number of circumstances which one can certainly not call objective. In a number of cases an underestimation of the importance of the branch leads to a situation where new construction projects and even startup complexes are not fully supplied with resources. Sometimes local organizations do not render the very necessary support in the location and construction of enterprises and the development of industries that have already been created.

The construction deadlines are not being met by the Kremenchug and Mozyr' plants, with capacities of 120,000 and 300,000 tons of nutritive yeasts a year, respectively; at the Tripol'skiy biochemical plant, where lysine is to be produced; and at the Khorskiy (Khabarovskiy Kray) and Parfinskiy (Novgorodskaya Oblast) hydrolysis plants which are intended for producing 38,000 tons of nutritives yeasts and 12,000 tons of furfural each.

Enterprises of the USSR Ministry of the Timber and Wood Processing Industry and of several other ministries and departments have been failing to meet planned deliveries of timber and agricultural wastes for a number of years now. The hydrolysis industry annually processes up to 7 million solid cubic meters of unmarketable wood and lumber wastes. But, for example, in 1979 they failed to receive 2 million cubic meters of this raw material. Yet, after all, every five tons of shavings that are transformed in our plants into protein yeasts make it possible to obtain 20 tons of mixed feed that is enriched with protein.

The delay in the startup of new capacities and the incomplete loading of existing enterprises because of a shortage of raw material cause harm to animal husbandry and reduce the production of meat and other food products.

In the next few years the rates of development of the microbiological industry and the industries in its production potential should be sharply accelerated. It will be necessary to construct and put into operation plants with an overall capacity of more than 1.2 million tons of nutritive yeasts. Their output will exceed 2.3 million tons. Lysine production will reach 32,000 tons and nutritive antibiotics--more than 2,000 tons.

In this connection, the question of sources of raw material is becoming quite critical. As research has shown, the lower alcohols and natural gas are extremely promising initial products for growing microbiological protein and acetic acid can be used in lysine production.

The Glavmikrobioprom in conjunction with the USSR Academy of Sciences and the ministries of the gas, petroleum, petroleum processing and petrochemical industries have developed a program for creating large-scale production of yeast protein on the basis of synthetic ethyl alcohol. One of the plants of the branch in Ufa has been reconstructed and is producing proteins for mass testing in agriculture. Planning development is in process for a large experimental industrial plant of this type that will produce 100,000 tons of protein a year. The next large stage is the assimilation of biosynthesis of nutritive protein from synthetic methyl alcohol and natural gas.

It is necessary to develop more extensively research on highly productive micro-organisms for biosynthesis of proteins and other valuable substances and also those kinds of micro-organisms which are capable of rapidly decomposing residuals of herbicides, toxic chemicals and harmful wastes of chemical and other industries in the water and soil.

We are convinced of the essential need for a large-scale, long-term program for the development of the microbiological industry. It should be directed primarily toward complete satisfaction of the needs of agriculture for nutritive protein, lysine, vitamins, nutritive sugar, agents for plant protection and other products of microbiological synthesis.

At the present time there is increasing interest in biotechnology in a number of new branches, including heavy industry. Among the consumers of products of comprehensive processing of wood, especially furfurol and its derivatives and components of microbiomass are high-quality metallurgy, chemistry and machine building, and the petroleum processing and aviation industries.

Frequently that which was previously considered a production waste is now becoming a valuable raw material. In the hydrolysis industry, for example, for each ton of yeasts it is necessary to have more than 1.5 tons of lignin which they used to throw away. Now some of the lignin is already being processed into nitrolignin, carbonized and activated coals, and fuel briquettes for public consumption. Metallurgists have devoted attention to lignin as a most valuable reducing raw material. They think that even in the near future it will become possible to use it to smelt extra pure ferrous and non-ferrous metals as well as in the development of the technology for reducing iron ores without a furnace--after all, lignin does not contain sulphur or other harmful impurities.

In machine building they are rapidly introducing methods that make it possible to obtain high-precision castings and refined billets. Collectives of our branch should contribute significantly to this since the synthetic resins necessary for this kind of casting are produced on the basis of furfuryl alcohol which is produced at hydrolysis enterprises.

Nor can one fail to take into account the fact that the development of the microbiological industry is making it quite possible to produce food supplements from non-food raw material, products of high nutritive value, perfumes and other consumer goods as well as effective veterinary, therapeutic and prophylactic preparations.

The list of examples that show the broad possibilities and the great national economic significance of the microbiological industry could easily be continued. "Biologization" of production is becoming one of the most important directions of scientific and technical progress. [382-11772]

11772
CSO: 1840

MICROBES TO PLAY IMPORTANT ROLE IN FUTURE INDUSTRY

Moscow PRAVDA in Russian 2 Jun 80 p 2

[Article: "Tomorrow's 'Professions' for Invisible Beings"]

[Text] In recent years our country has created biochemical plants at which microbes are fed with purified petroleum paraffins and full-value fodder proteins are obtained as a result. But one asks if it is really necessary to have "indoor" maintenance of the micro-organisms and is it mandatory to deliver feed to them?

Specialists think that it is quite possible to "graze" the microbes in places where there is always paraffin, for example, at petroleum processing plants. Why not instruct the micro-organisms to purify diesel fuel of paraffins? This will make it possible simultaneously to obtain high-quality fuels and protein-vitamin concentrate.

Another direction is the Mangyshlak petroleum industry. If it were entrusted to the microbes to extract paraffin from the thick and sticky petroleum here, this would not only improve its physical characteristics, but would also provide several million tons of protein concentrate a year as a byproduct.

In terms of its chemical essence microbial protein is an excellent polymer. Therefore there recently arose the idea of trying to use it for manufacturing special fibers and films that are similar in their quality and properties to natural silk and wool. Small additions of this same product promise essentially to improve the quality of certain kinds of artificial rubber and also increase the strength and durability of concrete.

Amino acids produced by microscopic beings have valuable nutritive qualities. Bread to which has been added a negligible amount of lysine is almost as satisfying as meat. Another amino acid--glutamic acid--when added to bouillon, potatoes or gruel, not only increases the nutritive value of the products, but also gives them the taste of chicken.

Microbiologists think that in the near future amino acids will become widely used in our country and will be kept on the table just as salt and mustard are now.

The capabilities of micro-organisms to synthesize the most diverse substances seem unlimited to many scientists. Apparently they are not far from the truth. In any case in a number of laboratories microbiological synthesis is confidently being pressed forward, as a result of which they are obtaining a large quantity of biofats, and extremely varied ones. Scientists predict that it is possible to develop microbe fats which will be close in composition to sunflower, corn, castor, olive and even palm and other exotic oils. Will they not make it possible to release edible vegetable oils, which are still being used for technical purposes, to be used for their immediate purpose?
[582-11772]

11772
CSO: 1840

NEW USES FOR PRODUCTS OF MICROBIOLOGICAL INDUSTRY

Moscow PRAVDA in Russian 2 Jun 80 p 2

[Article: "Scientists Suggest"]

[Text] In order to raise fodder yeasts on vegetable raw material, it is preliminarily subjected to fairly complicated processing. Now scientists have created a method of direct transformation of deciduous wood, straw and so forth into protein-carbohydrate feeds. To do this, a special variety of microscopic unicellular fungi is planted directly on the vegetable raw material. They break down the cellulose and transform it into sugar, while at the same time growing themselves and rapidly forming protein mass.

A remarkable product is now being produced by the microbiological industry: enzymes. The sphere of their application is rapidly expanding. For example, when they are used to process straw, reeds, cotton bolls, and similar materials, feeds are produced that are rich in sugars and easily digestible by animals. The application of microbial enzymes in poultry raising increases the egg productivity of the hens and the weight gain of the broilers. They produce a good result when used in cheese making and the fur industry.

In the Solntse scientific production association, by a joint decision of Glavmikrobioprom and the Turkmenskaya SSR, a branch scientific research laboratory for industrial photosynthesis was created. Its task is to develop, and introduce into practice processes and equipment that are intended for raising microbial yeasts, under industrial conditions for feeding cattle.

As experiments have shown, in special equipment with non-nutritive raw material, one can successfully raise mycelia of higher fungi. The protein contained in such "plant" fungi is distinguished by high quality and excellent protein that is comparable to that of soy beans.

One of the plants of the branch has organized the production of a new, highly effective flu vaccine, which was developed by the Institute of Epidemiology, Microbiology and Hygiene imeni Pasteur in conjunction with the Institute of Nuclear Physics imeni B. P. Konstantinov of the USSR Academy of Sciences and the Leningrad Polytechnical Institute imeni M. I. Kalinin.

Enterprises of the branch are mastering production of another prophylactic preparation as well--highly pure interferon. A number of enzymes and amino acids for medicinal purposes have been developed.

Installations in which they cultivate isolated cells of the celebrated "root of life"--ginseng--have begun to operate at biochemical enterprises of Glavmikrobioprom. So the dream about plant raising of cells and tissues of rare plants and sometimes those that do not grow at all in the USSR is becoming reality. Microbiologists are delivering their own production to the medical and perfume industry.
[582-11772]

11772
CSO: 1840

UDC 619:576.809:615.371/372

REQUIREMENTS FOR STRAINS OF MICROORGANISMS USED IN PRODUCTION OF BIOLOGICAL PREPARATIONS

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 33-35

SELIVANOV, A. V., KIRILLOV, L. V. and BORISOVICH, YU. F., All-Union State Scientific Control Institute of Veterinary Preparations

[Abstract] The basic requirements for production of industrial and control strains of microorganisms are cited and discussed. Requirements described include: the classification of such microorganisms and providing assurance of their genetic character; insuring their immunogenic properties and preparations of a detailed certificate according to a standard form for all strains and preservation of the strains and preparations produced. These procedures were approved by the Main Administration of Veterinary Medicine of the USSR Ministry of Agriculture, on 19 June 1978.
[579-2791]

PLANT BIOCHEMISTRY

UDC 631.527:008:631.544.4:628.8

PROBLEMS AND DEVELOPMENTAL PROSPECTS OF GENETIC-SELECTION RESEARCH UNDER CONTROLLED CLIMATE CONDITIONS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 1-6

SECHNYAK, L. K. and BIRYUKOV, S. V., All-Union Selection and Genetics Institute

[Abstract] The All-Union Selection and Genetics Institute has developed a special phytotron--controlled climate complex--in Odessa. The Odessa phytotron, which covers 3,000 sq m of floor space, is the site of industrial tests and operating trials of the first specimens of Soviet-produced controlled-climate facilities such as KNT-1 low temperature chambers, KV vegetation chambers, or DRF-1000 mercury arc lamps. These facilities are used for new research into, e.g., the development of techniques for rapid identification of genes and gene units (e.g. the use of protein electrophoresis to identify the genes controlling the synthesis of prolamines in wheat and barley) and research into the identification of discrete physiological systems conditioning the genotype productivity level, with the object of selecting frost-resistant and disease-resistant genotypes (winter wheat and barley), as well as drought-resistant genotypes. Other trends of research pursued include transgenosis, heterosis, and the selection of high-yielding high-grade crop varieties and hybrids displaying resistance to a broad spectrum of pests and diseases, as based on the genetic approach. Here, too, controlled climate is a prerequisite for obtaining reliable data. The quality of the Odessa phytotron is characterized as still leaving much to be desired. Many of its facilities are defective while others need yet to be installed. The quality of its staffing, too, needs improvement. [581-1386]

UDC 633.1:631.527.5

EFFECT OF HETEROSIS ON INTERVARIETAL HYBRIDS OF WINTER RYE

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 14-16

IL'ICHEV, G. A., candidate of agricultural sciences

[Abstract] Heterosis in winter rye was investigated using pollinating maternal plants with pollen of the paternal variety, and employing a modified method of castration. The hybrid offspring were evaluated according to grain yield. Tests of 55 hybrid combinations were performed in 1969-1970 and 65 in 1972-1976. Most of the hybrids were obtained through direct reciprocal crossing of best Soviet and foreign rye varieties. Four intervarietal hybrids for which heterosis resulted in increasing grain yields by more than 25% were isolated: Moskovskaya karlikovaya x Petkus Kurzstroh, Moskovskaya karlikovaya x Kungsrag 11, Moskovskaya karlikovaya x Dominant, and Danaye x Vyatka 2. The most disease-resistant hybrid proved to be Danaye x Vyatka 2. In view of the lodging-proneness of native winter rye varieties, the use of lodging-resistant foreign varieties in domestic selection, such as Petkus Kurzstroh, Danaye, Stalrag, Kungsrag II, and others, has contributed to the selection of varieties with greater resistance to lodging. But much still remains to be done in this direction, through the selection of short-stalked rye varieties. Further, increasing attention to being paid to the tetraploid forms of winter rye. Tests of 50 intervarietal hybrids developed from the best varieties of tetraploid rye resulted in the development of optimal combinations for which heterosis increases grain yields by 13-41%: Svalöf 58/155 x Belta, Svalöf 52/402 x Belta, Selectie Wageningen x Belta, and Bezenchukskaya x Belta. The results achieved so far demonstrate the promise of heterosis to improvements in winter rye. A major unsolved problem, however, is the development of methods for the mass production of hybrid seeds.
[581-1386]

UDC 633.358:631.528.62

CHEMICAL MUTAGENESIS IN THE SELECTION OF PEAS FOR QUALITY

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 18-19

MASALOVA, V. N., candidate of biological sciences

[Abstract] Changes in the fractional and aminoacid composition of protein in pea seeds under the action of chemical reagents were investigated from the standpoint of selection for quality. Seeds of the Chishminskaya 10 variety and their mutants obtained by treatment with 0.05% aqueous solution of ethylmethanesulfonate were used in the experiment. The tests showed that, within an average of 2 years, certain mutants such as the seeds of the Chishminskaya 208 variety, contained 28.1% more protein than did the original variety. There were no significant differences in fractional composition among the mutants or between the mutants and the original variety, but some mutants surpassed the original variety in the content of certain aminoacids. Thus, e.g., mutant 177 had a 1.4% higher content of hysine and a 1.9% higher content of aspartic acid. Thus, treatment of seeds with chemical mutagens produces varied material for further selection for quality. Mutants selected for the content and quality of protein should best be isolated in M_3 and M_4, since selection in earlier generations is more labor-consuming and reduces the chances for selecting forms with optimal content and quality of protein.
[581-1386]

UDC 633.14:631.527:631.524.84

VALUABLE SPECIMENS OF TETRAPLOID WINTER RYE

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 p 28

KLIMOV, V. V., LITOVCHENKO, M. F. and CHERNYAVSKAYA, L. S., Scientific Research Institute of Agriculture of the Non-Chernozem Zone of the UkrSSR

[Abstract] A 1976-1977 study of 13 varietal specimens of domestically selected and 33 of foreign-selected winter rye is described. The growing of these specimens on 1 m^2 plots resulted in the selection of short-stalked, bushy, and high-yielding (high grain content) varieties. The Latvian Vayve, Leningrad Tetra, and Canadian Petkus Kurzstroh, in particular, displayed the shortest stalks (152-155 cm high compared with 160-200 cm for other varieties). The bushiest varieties were Nemchinovskaya Tetra, Omka, Zhitomirskaya Tetraploid, and others. More than 50 grains

per ear were found in the Nemchinovskaya Tetra, Omka, Udinskaya Tetra, and certain other varieties. In most of the varieties, the 1000-grain mass exceeded 50 g. The most large-grained varieties (1000 grains per 60 g) were Svalöf 408, Khadmerslebener, Petkus Tetra, No 10044, Sopronkhorpaksi (60 g), Helcorn, Tetra Hybrid, and Poly-6. A high-grain content was displayed by the following varieties: Belta (78%), Leningradskaya Tetra (80%), Zhitomirskaya Tetraploidnaya (81%), Bernburger (81%), and Vadetra (79%), among others. The selected valuable varietal specimens may be used as starting material for the selection of tetraploid winter rye suitable for growing in the Polessie region of the Ukrainian SSR.
[581-1386]

UDC 631.526.32:631.531

PRODUCTION OF NEW SEED VARIETIES SHOULD BE EXPEDITED

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 36-39

GULYAYEV, G. V., and BOL'SHAKOV, N. V., candidate of agricultural sciences

[Abstract] Seed production can and should be best expedited by optimizing planting techniques and schedules. Personal research by the authors established the high efficacy of sowing winter wheat and barley in 15-50 cm strips at the rate of 2-2.2 million grains per hectare, which resulted in the same yield as sowing in drills at the rate of 5 million grains per hectare. Grain yield can also be increased by doubling or tripling the crop nutrition area, which also results in yielding higher-grade seed grain. It was also established that the seed reproduction rate increases upon systematic application of increased doses of nitrogenous fertilizers against a moderate phosphoric-potassic fertilizer background. Seeds with optimal physical and planting qualities as well as high-yielding qualities are obtained when the NPK fertilizer doses are properly balanced. Treatment with herbicides and retardants is not recommended in seed nurseries, since these agents produce a mutagenic effect. On the whole, a special set of techniques and measures is needed to produce high-grade seeds in adequate quantities. Figure 1.
[581-1386]

PLANT PATHOLOGY

UDC 633.11:631.524.86

IDENTIFICATION OF DONORS OF RESISTANCE TO YELLOW RUST OF WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 26-28

GOGUN, G. B., candidate of agricultural sciences

[Abstract] Donors of resistance to yellow rust were investigated on adult field-grown wheat plants during 1972-1976 in Krasnodarskiy Kray. Domestic and foreign varieties were used for the hybridization. The plants were infected with uredospores of the local population of causative agents of yellow rust. Tabulation of the findings shows that the varieties Kavkaz, NS-476, and Rostovchanka when crossed with susceptible varieties, produce in the second generation only highly resistant plants and display a broad-spectrum resistance due to the effect of several genes. A study of later generations, performed on 364 seeds selected from 20 varietal combinations, showed that the hybrid FKN x Kavkaz resulted in the largest number of resistant seeds. This hybrid is of major value considering that its parental form display major genealogical differences. Thus, the FKN 25 variety derives from a complex United States hybrid--the Frontana-Kenya 58-Newthatch, which, in its turn derives from parental varieties in Brazil, Africa, and North America. The immune Kavkaz variety also was developed from geographically remote varieties: Neuzucht in Germany and Bezostaya 4 in the Kuban', the latter having been developed by combining valuable properties and qualities of many varieties from many countries. The best resistance donor is that variety which not only is resistant itself during early and late stages of its development but also passes on a firm resistance to its offspring. This study found the Kavkaz variety to be such a donor.
[581-1386]

UDC 633.11±633.14:632.9

RESISTANCE OF AMPHIDIPLOID 206 TO DISEASES AND PESTS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Feb 80 pp 33-34

TERYAYEV, S. A., candidate of agricultural sciences, Head, Entomophytopathologic Varietal Section, Stavropol'skiy Kray

[Abstract] A new variety of high-grain triticale, Amphidiploid 206 has been grown since 1979 in the 2nd and 3rd regional zones of Stavropol'skiy Kray. The new variety was developed by the Yur'yev Ukrainian Scientific Research Institute of Plant Growing, Selection, and Genetics, by the method of complex interspecies and intergeneric crossings, polyploidy, and depolyploidization from such parental forms as Bezostaya 1 soft wheat, Gordenforme 931 winter durum wheat and Gordenforme 911, and Khar'kovskaya 55 and Saratovskaya Large-Grained varieties of winter rye. The new variety is high-yielding. On experimental plots during 1975-1978 its yields ranged at 43.0-66.6 centners per hectare. It is also more resistant (compared with winter wheat) to pests and diseases. During the 1975-1978 tests Amphidiploid 206 was found to be under field conditions almost completely resistant to brown rust and powdery mildew, and its susceptibility to loose smut was only 0.20%, whereas the locally grown Bezostaya variety was somewhat more susceptible to these diseases. Moreover, Amphidiploid 206 was found to be more resistant than winter wheat to septoria leaf spot, and more resistant than Bezostaya 1 to the sawflies (Cephus cinctus).
[581-1386]

VETERINARY MEDICINE

UDC 619:616.981.45:636.5

RESISTANCE OF CHICKS TO PASTEURELLOSIS

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 p 36

GADZHIYEV, K. SH. and KHALILOV, A. G., Azerbaijan SSR Republic Veterinary Laboratory

[Abstract] A pasteurellosis outbreak in Geokchay Rayon of the AzSSR is described. A study of the outbreak indicated that chicks under 45 days old were more resistant to the disease, even when exposed to older birds susceptible to the disease. This was confirmed in experiments involving 20 chicks under 45 days old infected by the causative agent of the disease. In spite of survivals, the causative agent survives well in the internal organs and this indicates the need to isolate birds of different ages.
[579-2791]

UDC 619:616.995.42:632.951

RESISTANCE OF IXODIDAE TICKS TO ACARICIDES

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 44-47

POLYAKOV, D. K., SMIRNOVA, O. I., KASHCHENKO, G. Z., KHAYDAROV, K. M., DIKAYEV, B. YU., SAITKHANOV, B. G. and ABROROV, G. A.

[Abstract] A rapid "express" method for detecting resistant strains of ticks is described and some results of its use presented. The method is based on the processing of tick-infested animals by diagnostic concentrations of acaricides. A diagnostic concentration is the dilution of the active substance of the acaricide preparation which kills 100% of the

heavy and moderately feeding ticks of normal sensitivity within 24 hours while resistant ticks survive and stay active. The resistance of ticks to an acaricide on experimental and control animals is determined by this method under field conditions within 6 days after planned processing to prevent cumulation and increase of potency of the diagnostic concentration. On the next day, control and experimental animals are treated with the other cattle by established rules of veterinary legislation. If an acaricide is ineffective in an area where resistance of ticks to it has been established, it must be replaced by another acaricide.
[579-2791]

UDC 619:615.93

TOXICITY OF THE TOTAL ALKALOIDS OF HARMEL

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 57-58

PUZIY, A. D., VECHERKIN, S. S., TRIBUNSKIY, M. P. and ROMAKHOV, V. G., Kirghiz Scientific Research Institute of Animal Husbandry and Veterinary Science

[Abstract] A study of the toxicity of alkaloids in harmel used white mice (90), rabbits (30) and bulls (5) and employed subcutaneous injection of an acidified aqueous form to mice (85 to 545 mg/kg) and to rabbits (95 to 150 mg/kg) and intravenous administration to bulls (4 to 10 mk/kg of body weight). For mice, the maximum tolerable dose (LD_0) is 83 mg/kg; LD_{50} is 208 ± 15.9 and LD_{100} is 545 mg/kg. For rabbits LD_0 is 95 mg/kg, LD_{50} is 125 ± 6.2 mg/kg and LD_{100} is 150 mg/kg. Doses from 4.2-7.2 mg/kg did not cause symptoms of toxicity in bulls. One bull showed rapid breathing (1.5 times initial level) 3-5 minutes after a 4.2 mg/kg dose.
[579-2791]

UDC 619:615.93:636.51

SUB-ACUTE T-2-MYCOTOXICOSIS IN FOWL

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 58-59

KOTIK, A. N. and TRUFANOVA, V. A., Ukrainian Scientific Research Institute of Poultry Raising

[Abstract] A study of the comparative sensitivity of 1-21 day old white leghorn chicks, white, broad-breasted turkey chicks, Ukrainian white-headed ducklings and gray Ukrainian goslings to different concentrations

of T-2 mycotoxin showed that T-2 mycotoxin in doses from 0 to 16 mkg/kg for chicks, turkeys and duckling and in doses from 0 to 4 mkg/g for goslings, in identical fodders, caused toxicosis, increased mortality (only at 16 mkg/kg for chicks but below 4 mkg/kg for the other fowl), delayed growth; depression, ruffling of plumage and development of necrotic lesions of the mucosa of the mouth and tongue occurred.
[579-2791]

UDC 619:616.988.73:636.5

CHICKEN INFLUENZA CAUSED BY A VARIANT OF THE GP-4 VIRUS

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80 pp 64-66

SMOLENSKIY, V. I. and AFRIKANTOV, S. G., RSFSR Ministry of Agriculture Scientific-Commercial Laboratory for Disease Control in Young Farm Animals ZHUKOV, I. V., Lipetsk Oblast Veterinary Laboratory

[Abstract] An influenza (GP-4 virus) outbreak in the winter-spring period of 1979 at a large poultry plant began among 60-70 day old birds in a shop containing 11,500 cockerels and zootechnical discards kept under less than ideal conditions. Nearly 8 percent of the birds died within 19 days without pronounced clinical symptoms and the rest were slaughtered. The infection was found to be widely spread in that region and to be caused by a virus strain antigenically related to the standard strain A/duck/Czechoslovakia/56 (GP-4). The poor conditions of care contributed greatly to the severity of the outbreak. Prevention and sanitation measures should include prevention of stress situations and prevention of spread of the infection from wild fowl.
[579-2791]

UDC 619:576.851.46:636.4

SEROLOGICAL VARIANTS OF HEMOPHILIC BACTERIA, ISOLATED FROM SWINE

Moscow VETERINARIYA in Russian No 4, Apr 80 signed to press 14 Mar 80
pp 66-67

SIDOROV, M. A., SKORODUMOV, D. I., GUMBATOV, YU. K. and TARASENOK, N. I., All-Union Institute of Experimental Veterinary Medicine

[Abstract] The complement fixation reaction was used in a study of 38 strains of hemophilic bacteria, isolated from piglets suffering from polyserositis. It was found that H. parasuis serotypes D, A and B play a key role in the etiology of hemophilous polyserositis. The complement fixation reaction can be used to determine the species of hemophilic bacteria and also for blood typing of epizootic strains.
[579-2791]

CSO: 1840

- END -

END OF FICHE

DATE FILMED

8-18-80

D.P.